LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-14 (Canceled)

Claim 15 (Currently Amended)

An apparatus for polishing side faces of grooves formed on a workpiece comprising:

a fixture for fixing the workpiece;

a rotating shaft disposed in a horizontal direction of the fixture;

a rotary driving unit for rotating the rotating shaft;

a disc polishing element having abrasive grains thereon for polishing the side faces of the grooves, the polishing element being fixed to the rotating shaft;

wherein said disk polishing element has said abrasive grains on a side face thereof for polishing said workpiece, and said disk polishing element further comprises abrasive grains at a peripheral edge thereof for cutting said workpiece;

a driving unit for moving at least one of the rotating shaft and the workpiece in the vertical direction, horizontally in the longitudinal direction of the rotating shaft, and horizontally in the longitudinal direction of the grooves along the side faces of the grooves;

wherein the disc polishing element is movable by a reciprocating motion of the rotating shaft, whereby the disc polishing element has both rotary motion and reciprocating motion; and

a detector ~~comprising a Hall sensor~~ for detecting the position where the polishing element is in contact with the workpiece.

Claim 16 (Original)

An apparatus according to claim 15, wherein said abrasive grains on said disk polishing element have a cutting depth of about 10nm or less.

Claim 17 (Canceled)

Claim 18 (Currently Amended)

An apparatus for polishing side faces of grooves formed on a workpiece comprising:

a fixture for fixing the workpiece;

a rotating shaft disposed in a horizontal direction of the fixture;

a rotary driving unit for rotating the rotating shaft;

a disc polishing element having abrasive grains thereon for polishing the side faces of the grooves, the polishing element being fixed to the rotating shaft;

a driving unit for moving at least one of the rotating shaft and the workpiece in the vertical direction, horizontally in the longitudinal direction of the rotating shaft, and horizontally in the longitudinal direction of the grooves, along the side faces of the grooves;

wherein the disc polishing element is movable by a reciprocating motion of the rotating shaft, whereby the disc polishing element has both rotary motion and reciprocating motion; and

a detector for detecting the position where the polishing element is in contact with the workpiece, said detector further comprising a ~~Hall~~ sensor for detecting said contact position by detecting an electrical characteristic of said rotary driving unit, said electrical characteristic comprising at least one of a magnetic field and a current of said rotary driving unit.

Claim 19 (Canceled)

Claim 20 (Original)

An apparatus according to claim 15, wherein said driving unit drives said at least one of the rotating shaft and the workpiece using said detected contact position as a reference.

Claim 21 (Previously Presented)

An apparatus according to claim 18, wherein said abrasive grains on said disk polishing element have a cutting depth of about 10nm or less.

Claim 22 (Previously Presented)

An apparatus according to claim 18, wherein said disk polishing element has said abrasive grains on a side face thereof for polishing said workpiece, and said disk polishing element further comprises abrasive grains at a peripheral edge thereof for cutting said workpiece.

Claim 23 (Previously Presented)

An apparatus according to claim 18, wherein said detector detects said contact position by detecting a threshold of said electrical characteristic.

Claim 24 (Previously Presented)

An apparatus according to claim 15, wherein said detector detects a condition in which said polishing element is in contact with the workpiece.

Claim 25 (Previously Presented)

An apparatus according to claim 24, wherein said detector detects said condition by sensing an electrical characteristic of said rotary driving unit.

Claim 26 (Previously Presented)

An apparatus according to claim 25, wherein said detector detects said contact position by detecting a threshold of said electrical characteristic.

Claim 27 (Previously Presented)

An apparatus according to claim 15, wherein said driving unit is capable of moving said at least one of the rotating shaft and the workpiece, in each of said directions, while said disc polishing element is being rotated by said rotating shaft.

Claim 28 (Previously Presented)

An apparatus according to claim 18, wherein said driving unit is capable of moving said at least one of the rotating shaft and the workpiece, in each of said directions, while said disc polishing element is being rotated by said rotating shaft.

Claim 29 (New)

An apparatus according to claim 15, wherein said detector comprises a Hall sensor.

Claim 30 (New)

An apparatus according to claim 18, wherein said detector comprises a Hall sensor.